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OHIO

INDEX OF CURRENT WATER RESOURCES ACTIVITIES

ORIGINAL

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

1983

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EXPLANATION

- Columbus District Office
- New Philadelphia Subdistrict Office
- Drainage boundary between Lake Erie and the Ohio River
- Area covered by the Columbus District Office
- Area covered by the New Philadelphia Subdistrict Office

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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

INDEX OF CURRENT WATER RESOURCES PROJECTS AND DATA COLLECTION ACTIVITIES IN OHIO, 1983

Compiled by

Steven M. Hindall

Water Resources Division
U.S. Geological Survey
975 West Third Avenue
Columbus, Ohio 43212

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1983

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CONTENTS

Page

Introduction 1

Organization 2

Source of funds..... 4

Information contained in this report 4

Other information available 5

Part A. Current projects -- explanation 5

Part B. Hydrologic data collection stations--explanation 35

Part C. Selected references on Ohio hydrology 50

TABLES

Table 1. Surface water hydrologic data stations maintained by the U.S. Geological Survey in cooperation with other agencies 37

Table 2. Ground-water hydrologic data stations maintained by the U.S. Geological Survey in cooperation with other agencies..... 48

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INDEX OF CURRENT WATER RESOURCES PROJECTS AND DATA COLLECTION ACTIVITIES IN OHIO, 1983

Compiled by S.M. Hindall

INTRODUCTION

Mission and Program

The mission of the Water Resources Division, which supports the overall mission of the U.S. Department of the Interior and the Geological Survey, is to provide the hydrologic information and understanding needed for the best use and management of the Nation's water resources for the benefit of the people of the United States.

To accomplish its mission the Water Resources Division, in cooperation with State and local governments and other Federal agencies --

- Collects, on a systematic basis, data needed for the continuing determination and evaluation of the quantity, quality, and use of the Nation's water resources.

- Conducts analytical and interpretive water-resources appraisals to describe the occurrence, availability, and physical, chemical, and biological characteristics of surface and ground water.

- Conducts supportive basic and problem-oriented research in hydraulics, hydrology, and related fields of science and engineering to improve the basis for field investigations and measurement techniques and to understand hydrologic systems sufficiently well to predict quantitatively their response to stress, either natural or manmade.

- Disseminates water data and the results of investigations and research through reports, maps, computerized information services, and other forms of public releases.

- Coordinates the activities of Federal agencies in the acquisition of water data for streams, lakes, reservoirs, estuaries, and ground waters.

- Provides scientific and technical assistance in hydrologic fields to other Federal, State, and local agencies, to licensees of the Federal Energy Regulatory Commission, and to international agencies on behalf of the U.S. Department of State.

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ORGANIZATION

The Water Resources Division, which is one of five Divisions of the U.S. Geological Survey, is organized on two levels: Headquarters and field. The field organization consists of Regional, District, and Research Project offices.

Ohio District Office

Mailing Address - U.S. Geological Survey, WRD, 975 West Third Avenue, Columbus, OH 43212. Phone: (614) 469-5553

The Ohio District, one of 43 field offices throughout the United States, has its District headquarters in Columbus and a Subdistrict headquarters in New Philadelphia.

To carry out the diversity of tasks in support of the program in Ohio, the Ohio District is organized into two levels -- District and Subdistrict offices. Operations of the Ohio District are under the general direction of Steven M. Hindall, District Chief, and Frank W. Giessner, Assistant District Chief.

There are three sections in the District office in Columbus -- Hydrologic Records, Hydrologic Studies, and District Services, each with a different function.

The Hydrologic Records section, under the supervision of Harold L. Shindel, is responsible for the systematic collection of surface water data and the publication of basic water records as well as construction, operation and maintenance of the hydrologic station network. Data types include both continuous and periodic records of stream discharge, sediment loads, ground-water levels, and chemical quality of surface and ground water. The section has 16 hydrologic technicians and hydrologists and is responsible for data collection in the western two-thirds of Ohio. There are also some data-oriented projects assigned to section personnel, such as water use, water quality monitors, and ground water levels.

The Hydrologic Studies section, under the supervision of Richard V. Swisshelm, is responsible for conducting both problem-oriented and resource-appraisal types of hydrologic studies within the state of Ohio. The variety of current projects exemplifies the interdisciplinary capabilities of the section (ground water, surface water, and quality of water). Included are projects relative to the flow and water-quality of streams, flood characteristics, sediment transport, quantity and quality of runoff in urban areas, availability and quality of potential sources of ground water, and the effects of mining on the surface- and ground-water systems. The section has 21 hydrologists and technicians.

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The District Services section, under the supervision of Frank W. Giessner, Assistant District Chief, supports the activities of the other sections in the District, including the New Philadelphia subdistrict. This includes administrative services, computer services, instrument and equipment maintenance, laboratory services, and reports processing. There are 23 employees of varying disciplines in the section.

Ohio Subdistrict Office

Mailing Address - U.S. Geological Survey, WRD, 551 Wabash Avenue, New Philadelphia, OH 44663. Phone: (216) 343-2343.

Operations of the New Philadelphia office are under the general direction of Ronald R. Schwartz, Subdistrict Chief.

The subdistrict functions are similar to the district with both hydrologic data collection and hydrologic studies being carried out by the 10 hydrologists and hydrologic technicians located at that office. The functions of the Hydrologic Records and Hydrologic Studies units of the subdistrict are identical to those respective sections at the District office. Administrative and technical support for the subdistrict is provided by personnel at the District office. The eastern one-third of Ohio is the main area of concern for the New Philadelphia subdistrict, although they have state-wide responsibility for the lowflow and crest-stage gage networks.

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SOURCE OF FUNDS

The Water Resources Division's programs are funded as follows: (1) Federal program which is specifically identified in annual Geological Survey appropriations; (2) Federal-State cooperative program, where the Water Resources Division represents national interests, the cooperating agencies represent State and local interests, and the funding is shared up to 50/50, with the Federal share coming from direct Congressional appropriations; and (3) other Federal agencies (OFA) program, which is funded by the agencies that request the work.

The Ohio program is carried out largely in cooperation with the following agencies

City of Canton
City of Columbus
Corps of Engineers, U.S. Army
  Buffalo District
  Huntington District
  Louisville District
  Pittsburgh District
Seneca Soil and Water District
Miami Conservancy District
Northeast Ohio Areawide Coordinating Agency
Ohio Department of Natural Resources
Ohio Department of Transportation
Ohio Environmental Protection Agency
U.S Department of Agriculture
  Science and Education Administration
U.S Department of Energy
U.S. National Park Service

INFORMATION CONTAINED IN THIS REPORT

This index consists of three parts: Part A, a listing and brief description of current projects: Part B, a listing of hydrologic data collection sites; and Part C a selected bibliography of Ohio hydrology.

Part A contains information on the status of all projects in which there has been or will be activity during 1983. Further information concerning project activities is available from the project leader or from Richard V. Swisshelm, Jr., Chief, Hydrologic Studies Section, District Office.

Part B contains tables showing station number and names, types of data collected, and identifies the projects benefiting from the data collected. Further information on station activities (state-wide), unpublished records, and provisional data prior to publication, is available from Harold Shindel Chief, Hydrologic Records Section District Office.

For stations located in eastern Ohio, this information is available from Ronald R. Schwartz, Chief, New Philadelphia subdistrict office.

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Part C is a selected list of reports issued over the years concerning hydrologic investigations in Ohio. The list is an updated version of the bibliography included in the pamphlet, "Water Resources Investigations in Ohio " last issued in 1977.

OTHER INFORMATION AVAILABLE

The U.S. Geological Survey publishes an annual series, "Water Resources Data for Ohio," in which the hydrologic data collected are published for each water year. Through the 1974 water year, data were published in two parts: "Part 1. Surface Water Records," and "Part 2. Water Quality Records." From the 1975 water year to 1978 water year, surface water, water quality and ground-water level data appeared in two volumes: "Volume 1. Ohio River basin," and "Volume 2. St. Lawrence River basin." In 1979, water level records for state-operated wells were added. Also, a supplemental volume, designated "Water Resources Data for Ohio, Appendix A., Coal Areas," was first issued to make available the large amount of hydrologic data accumulated in compliance with the Surface Mining Control and Reclamation Act of 1977. Copies of these reports can be obtained from the District Office or from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161. Phone: (202) 557-4650.

The Ohio District Office is the regional information center for the Earth Resources Observation systems (EROS) program and maintains a microfilm "browse" file, where the public may examine and order images from NASA's LANDSAT 1, 2, and 3 satellites. A microfiche catalog contains listings of all satellite data received since 1972, and is periodically updated to include new data. The imagery is stored on 16-mm microfilm and is available for most major land masses of the world. In addition to LANDSAT imagery, a complete set of SKYLAB high altitude photographs is available for inspection. The browse file enables the user to select and evaluate remote sensing imagery prior to purchase from the User Services Unit, EROS Data Center, Sioux Falls, South Dakota 57198. Phone: (605) 594-6511.

Flood-prone area maps are available from the District Office. These maps were prepared in cooperation with the U.S. Department of Housing and Urban Development, Federal Insurance Administration, to serve as valuable guides for public agencies and private citizens concerned with present and future land development. The maps were prepared on standard 7-1/2 minute topographic quadrangles and delineate the areas subject to inundation by a 100-year flood.

PART A

CURRENT PROJECTS -- EXPLANATION

The project descriptions in this section show the project number, title, period of the project, cooperating agencies, project leader, purpose of the project, progress, and status of any reports that have reached at least the first stage of review.

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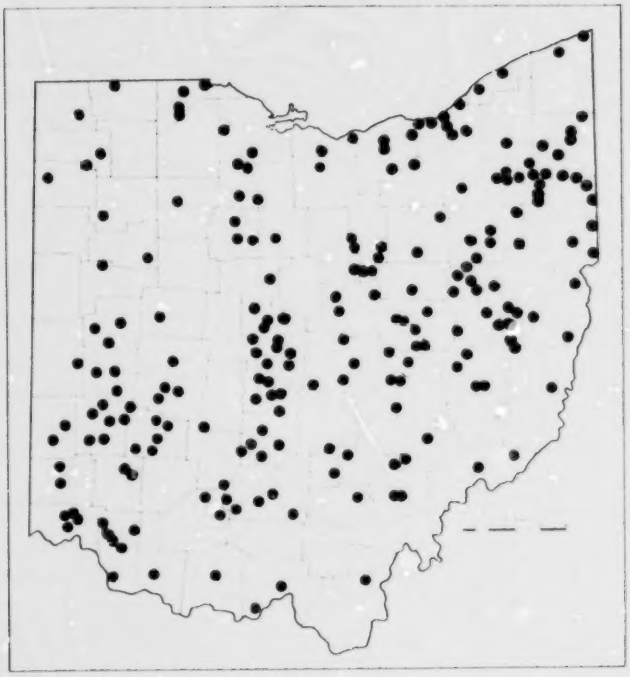
SURFACE WATER STATIONS
(OH001)

Period of Project:
Continuous since October 1915

Project Leader:
Harold L. Shindel

Cooperators:
Ohio Department of Natural Resources
City of Columbus
Miami Conservancy District
Ohio Environmental Protection Agency
City of Canton
U.S. Army Corps of Engineers
Northeast Ohio Area Coordinating Agency
Seneca Soil and Water District



Purpose: To provide a surface water data base through collection, analysis and publication of records for gaging stations and selected sites along streams, lakes, and reservoirs throughout Ohio. The gaging network is operated in cooperation with other Federal, State, and local agencies. The surface-water data base provides information for research purposes of surveillance, planning, design, hazards warning, accounting systems, operation, and management in various water-related fields.

Progress: Field data was collected on schedule and prepared for publication (1981 water year). Network maintenance was continued, including modernizing equipment in places to improve record quality. Modifications to the network, such as additions or deletions of stations or data collecting activity, were made in response to program's needs.

Reports: Data published in U.S. Geological Survey annual hydrologic data report "Water Resources Data for Ohio," volumes 1 and 2.

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GROUND-WATER STATIONS
(OH002)

o Active USGS site
• Discontinued USGS site

Period of Project:
Continuous since January 1938

Project Leader:
Alan C. Sedam

Cooperator:
Ohio Department of Natural Resources

Purpose: Ground water is important as a source of water supply for much of Ohio. Thus, it is essential to observe the effects on ground-water quantity and quality exerted by such factors as climatic variations and withdrawal patterns. Water-level data are collected to provide a data base against which short- and long-term fluctuations can be compared for proper planning and management.

Progress: Continuous water-level recorders were maintained at 40 stations operated by the U.S. Geological Survey and at 78 stations operated by the Ohio Department of Natural Resources, Division of Water. Data from all stations were collected on schedule and processed for publication in the District's water data report. For 1983, the Survey will operate 10 stations equipped with continuous recorders and the state will make periodic measurements at most of the 30 stations that the Survey has discontinued.

Reports: Data included in U.S. Geological Survey annual hydrologic data reports, "Water Resources Data for Ohio," volumes 1 and 2.

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WATER QUALITY STATIONS
(OH003)

Period of Project:
Continuous since January 1946

Project Leader:
Clifford G. Angelo

Cooperator:
Miami Conservancy District
Ohio Environmental Protection Agency
U.S. Geological Survey

Purpose: To collect, analyze and publish water-quality records for selected sites in Ohio in cooperation with State and local agencies. The records contribute to a national water-quality data base requisite to nationwide and regional planning and action programs.

Progress: Stations operated by the U. S. Geological Survey were 9 Nasqan and 1 Benchmark in the water-quality network in the 1982 water year. Four Miami Conservancy District ground-water sties were also sampled. The Geological Survey collects a water sample at the Nasqan sites for the Ohio Environmental Protection Agency for the determination of Chemical Oxygen Demand. The water-quality sampling at State Line Creek near Negley was discontinued by the Ohio Department of Natural Resources.

Reports: Data included in U.S. Geological Survey annual hydrologic data report, "Water Resources Data for Ohio," volumes 1 and 2.

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SEDIMENT STATIONS
(OH004)

Period of Project:
Continuous since July 1970

Project Leader:
Jesse H. Klingler

Cooperator:
Ohio Department of Natural Resources
U.S Corps of Engineers

Purpose: To provide a data base needed to assess sedimentation characteristics of drainage areas required for planning and management of State and Federal programs. The data is also needed to evaluate effectiveness of Ohio House Bill 513 concerned with the abatement of sediment pollution in both agricultural and urban situations.

Progress: A network of 6 daily sediment stations representative of Ohio's major physiographic provinces is being operated to provide spatial and temporal averages of concentration, discharge, and particle-size distribution of suspended sediment carried by major streams. Suspended-sediment data was also collected from finite-duration studies in selected agricultural, mined and urban areas.

Reports: Data included in U.S. Geological Survey annual hydrologic data report, "Water Resources Data for Ohio," volumes 1 and 2.

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WATER USE IN OHIO
(OH007)

Statewide

Period of Project:
Continuous since October 1977

Project Leader:
Donald K. Roth

Cooperator:
Ohio Department of Natural Resources

Purpose: To establish an effective and coordinated program for collecting, storing, accessing and disseminating water-use data. the program is expected to be compatible with a national data base for water use. In Ohio, there is a demonstrated need for the availability of water-use information on a local as well as statewide basis and which is also consistent with regard to definitions, standards, and methods of presentation.

Progress: Ohio water-use data for 1980 added to the National Water-Use Data System (NWUDS), a computer data base. Assisted in the publication of "Water--Ohio's Remarkable Resource," a popular leaflet on water availability and use. The leaflet was produced by the Ohio Department of Natural Resources, Division of Water, in cooperation with the USGS and the Cooperative Extension Service, Ohio State University.

Reports: Hathaway, R. M., and Heater, B. R., Ohio Industrial Water Use Data Dictionary: U.S. Geological Survey Water-Resources Investigations.

Hathaway, R. M., and Eberle, C. M., Water Use in Ohio, 1975: U.S. Geological Survey Water Resources Investigations 81-17. U.S. Geological Survey annual hydrologic data report, "Water Resources Data for Ohio, OH-82. Appendix A Coal Areas." U.S. Geological Survey open-file report, "Water Quality of Streams Draining Abandoned Surface Mine Lands in Ohio."

Reports in Progress: Eberle, Michael, and McClure, J. A., Water Use in Ohio, 1980: (Water-Resources Investigation).

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HYDRAULICS OF RIVER VALLEYS AND BRIDGE SITES
(OH010)

Statewide

Period of Project
Continuous since June 1963

Project Leader:
Donald K. Roth

Cooperator:
Ohio Department of Transportation

Purpose: To evaluate the hydraulic effects at sites of proposed or existing bridges and highway fills. Such structures decrease the capacity of river valleys for conveying flood waters and in turn may cause backwater and excessive upstream flooding. Information is needed by highway engineers for making decisions in the design process.

Progress: Field investigations and surveys will be conducted when necessary to obtain data required to supplement existing hydrologic data required to supplement existing hydrologic data for use in the hydraulic analysis, followed by a report, at sites specified by the cooperating agency.

Reports Published: Webber, E. E., and Mayo, R. I., 1980, Flood of June 18, 1978 on Honey Creek tributary at Thornville, Ohio: U.S. Geological Survey Open-File Report 80-16.

Mayo, R. I., and Bartlett, W. P., Jr., Hydraulic analysis, Paint Creek at State Highway 772, Chillicothe, Ohio: U.S. Geological Survey Water Resources Investigations Open-file Report 81-350.

Mayo, R. I., and Webber, E. E., Flood of August 20, 1979, on tributary of Chickamauga Creek near Gallipolis, Ohio: U.S. Geological Survey Open-File Report 81-414.

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LOW-FLOW CHARACTERISTICS OF OHIO STREAMS
(OH016)

Period of Project:
July 1971 to June 1983

Project Leader:
Ronald R. Schwartz

Cooperator:
Ohio Environmental Protection Agency

Purpose: To define the low-flow characteristics of all streams throughout Ohio that are not significantly regulated and would be useful in defining regional low-flow relationships and studies of point and non-point stream pollution. The information is needed for planning and management in projects such as water-supply systems, waste treatment or disposal and low-flow augmentation.

Progress: Low-flow characteristics have been defined through the use of records for about 250 continuous and/or partial-record stations. About 50 additional sites remain to be measured and the low-flow characteristics defined. Operation of a network of approximately 40 low-flow partial-record stations is continuing. Each station is operated for a period of 3-5 years with 3 or 4 low measurements made annually or until enough measurements have been made to define the low-flow characteristics.

Reports: Data included in U.S. Geological Survey annual hydrologic data report, "Water Resources Data for Ohio," volumes 1 and 2. Low-flow data to OEPA in September 1983 listing low-flow characteristics at all sites since last report.

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EFFECTS OF URBANIZATION ON RUNOFF FROM SMALL DRAINAGE AREAS
IN THE STATE OF OHIO
(OH028)

• Rainfall-runoff
▲ Rainfall-runoff & water quality

Period of Project
July 1974 to June 1986

Project Leader:
William P. Bartlett, Jr.

Cooperator:
Ohio Department of Transportation

Purpose To obtain runoff and water quality data applicable to areas affected by urbanization. Such information is needed by designers and planners of roadways and structures in urban settings. Much of the U. S. Geological Survey's basic streamflow program from rural areas has had little transfer value for predicting peak flows in areas of concern by urban planners. Phase One is to establish precipitation and runoff data collecting stations selected to represent differences in drainage areas, types of urbanization, flow regime and slope. Phase Two is to analyze and interpret the data through development and calibration of a rainfall-runoff model. Ultimately, a flow model for predicting peak discharge based on hydrologic, land use, meteorologic, and geologic parameters will be developed with modifications to give the model transfer value outside Ohio. Site data will also provide information relative to the total storm hydrograph which could lead to development of a reliable flood-volume model. Characteristic water-quality differences in relation to storm events at selected sites will be noted.

Progress: The original network of 30 urban sites has been reduced to a total of 16 as of September 30, 1982. Sufficient data has been collected at the 14 discontinued sites to allow calibration of a rainfall-runoff model, which is used to extend the records in time. Calibration is complete at one site and partially done at one other site. Long-term 5-minute data for selected events has been ordered for Columbus, Cincinnati and Cleveland. The collection of water-quality data has been completed at two sites, is underway at a third, and planned at a fourth.

Reports: Annual peak flows are included in the U. S. Geological Survey annual hydrologic data report, "Water Resources Data for Ohio," volumes 1 and 2.

Reports in Progress: Christman, J. D., and Hawkinson, R. O., Analysis of urban storm-water quality for two sites in Columbus, Ohio: U. S. Geological Survey Open-File Report.

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EFFECTS OF STRIP MINING ON THE GROUND-WATER HYDROLOGY OF SMALL WATERSHEDS (OH030)

Period of Project:
October 1975 to September 1983

Project Leader:
Allan C. Razem

Cooperator:
U.S. Department of Agriculture, Agricultural Research Service

Purpose: To describe the hydrogeology of four small watersheds associated with different coal seams; document the ground-water flow and water-quality characteristics for pre- and post-mining conditions; and develop a ground-water model to simulate flow through the aquifer system The information is needed for a better understanding of the hydrologic regimen if coal is to be extracted from the earth with the least amount of degradation to the physical environment.

Progress: Following the premining phase (1975-80) when geologic cores and observation wells were drilled, coal mining and site restoration was completed at three sites. A fourth site remains as a hydrologic reference site. Wells were reinstalled at mined sites to monitor resaturation of spoils. Water-quality data was collected quarterly before and semiannually after mining. From the data collected, potentiometric and water-quality maps were constructed and a ground-water flow model developed. Several progress reports have been completed.

Reports: Ground-water levels and water-quality data included in U.S. Geological Survey annual hydrologic data report, "Water Resources Data for Ohio," volumes 1 and 2.

Reports in Process: Razem, A. C., Ground-water hydrology of strip-mine areas in eastern Ohio (before, during, and after mining of a small watershed in Muskingum County).

Razem, A. C., Ground-water hydrology of strip-mine areas in eastern Ohio (before, during, and after mining of a small watershed in Coshocton County).

Razem, A. C., Ground-water hydrology of strip-mine areas in eastern Ohio (before, during, and after mining of a small watershed in Jefferson County).

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Reports Published: Hamon, W. R., Bonta, J. V., Haghiri, Faz, and Helgesen, J O., 1979, Research on the hydrology and water quality of watersheds subjected to surface mining, I. Premining hydrologic and water quality conditions, in Symposium on surface mining and reclamation: Louisville, Kentucky, Coal Age, p. 70-98.

Helgesen, J. O., and Razem A. C., 1980, Preliminary observations of surface mine impact on ground water in two small watersheds in eastern Ohio, in Proceedings of surface mining hydrology, sedimentation and reclamation symposium, University of Kentucky, Lexington, December 1980.

Helgesen, J. O., and Razem, A. C., Ground-water hydrology of strip-mine areas in eastern Ohio (conditions during mining of two watersheds in Coshocton and Muskingum counties): U.S. Geological Survey, Water Resources Investigations, Open-file report 81-913.

Helgesen, J. O., Larson, S. P., and Razem, A. C., Model modification for simulation of ground-water flow through stratified rocks in eastern Ohio: U.S. Geological Survey, Water Resources Investigations, Open-file report 82-4019.

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INVESTIGATION AND ANALYSIS OF FLOODS FROM SMALL NORTHWESTERN, STRIP-MINED, AND FORESTED DRAINAGE BASINS IN OHIO (OH034)

Period of Project:
July 1977 to June 1988

Project Leader:
James R. Kolva

Cooperator:
Ohio Department of Transportation

Purpose: To determine flood characteristics for 30 small basins in reclaimed strip-mined and forested areas. Information is needed for engineering design purposes concerning the degree to which flood flows from small basins are influenced by strip-mine reclamation techniques and by forest cover. Flow model to predict peak discharge, along with an updated flood frequency report, are to be prepared which are applicable to a wider range of land-use types than previously available.

Progress: A 30-station network is operational and discharge rating curves have been developed for all stations. Annual peak elevations and discharges have been determined to date. Recent aerial photographs of surface-mined basins have been collected.

Reports: {Data included in U.S. Geological Survey annual hydrologic data report, "Water Resources Data for Ohio," volumes 1 and 2.

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HYDROLOGIC EFFECTS OF MINE SEALING ON SURFACE- AND GROUND-WATER RESOURCES IN LAKE HOPE BASIN (OH040)

Period of Project:
July 1978 thru September 1983

Project Leader
Vance E. Nichols

Cooperator:
Ohio Department of Natural Resources

Purpose. To monitor the effects of sealing techniques used to alleviate acidic drainage from a drift-mine complex on surface and ground-water systems in Big Four Hollow Creek and Sandy Run, tributaries of Lake Hope.

Progress: Pre-construction data collected to establish baseline conditions. Clay dike and seals constructed to alleviate acid drainage from drift-mine complex. Observation wells and surface-water sites instrumented. Collection of water-level, water-quality, streamflow, and sediment data is continuing.

Reports in Progress: Nichols, V. E., Drift mine reclamation in Big Four Hollow, near Lake Hope, Ohio--A preliminary date report.

Nichols, V. E., Drift mine reclamation in Big Four Hollow near Lake Hope, Ohio--Final report.

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WATER MONITORING IN COAL MINING AREAS
FOR P.L. 95-87, OHIO
(OH041)

Period of Project:
July 1978 to September 1983

Project Leader:
Donald K. Roth

Cooperator:
U.S. Geological Survey

Purpose: (1) To establish a network of surface-water gaging and sampling stations in the Ohio portion of the eastern coal province which will provide a standardized data base of flow, biological, suspended-sediment and chemical-quality data. (2) To evaluate mining impact through a modeling approach based on geology, type and degree of mining activity and use of climatological, hydrogeological and stream-quality data.

Progress: A network of 50 to 311 sites in coal areas were measured and sampled 1979-81, plus several continuous record stations that were established to function as trend and reference sites. Two sampling runs per year were made, one at high flow and one at low flow. Biological data has been collected at low flow. Sediment data is collected daily at the continuous record stations and at other selected sites under certain conditions of stream flow. Basic data from the project has comprised a special volume of the district's water data report for 1979 and 1980, and combined with the regular volume for 1981. Hydrologic assessment reports for sections of the state's coal area have been completed.

Reports: Basic data included in "Water Resources Data for Ohio," U.S. Geological Survey Water Data Reports OH-79, volumes 1 and 3; OH-80, volume 1 and Appendix - Coal Areas; and OH-81, volumes 1 and 2.

Roth, D. K., Engelke, M. J. and others, Hydrology of Area 4, eastern coal province, Ohio, Pennsylvania and West Virginia: U.S. Geological Survey Water-Resources Investigations/Open-File Report 81-343.

Engelke, M. J., Roth, D. K. and others, Hydrology of Area 7, eastern coal province, Ohio U.S. Geological Survey Water-Resources Investigations/Open-file Report 81-815.

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Reports in Progress: Roth, D. K., Cooper, S. C. and others, Hydrology of Area 11, eastern coal province, Ohio, Kentucky, West Virginia: U.S. Geological Survey, Water-Resources Investigations Report.

Ehlke, T. A. and others, Hydrology of Area 8, eastern coal province, West Virginia, Ohio: U.S. Geological Survey, Water-Resources Investigations Report.

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AUTOMATIC MEASUREMENT OF TEMPERATURE, SPECIFIC CONDUCTANCE, DISSOLVED OXYGEN AND pH IN SELECTED STREAMS IN OHIO
(OH042)

Period of Project:
November 1978 to September 1983

Project Leader:
Max S. Katzenbach

Cooperator:
Ohio Environmental Protection Agency

Purpose: (1) To continuously collect stream temperature, dissolved oxygen, specific conductance and pH data which will serve (either as direct or surrogate) indicators of water quality conditions in analyses conducted by the U.S. Geological Survey and State agencies to determine the impact and severity of man's influence on surface waters. (2) To provide relevant standardized data collected continuously for comprehensive study by the U.S. Geological Survey and other agencies.

Progress: Specific conductance, dissolved oxygen, water temperature, and pH data were collected at 10 monitor stations and data prepared for publication. Operation of network continues with the number of sites being adjusted as necessary in consultation with cooperating agencies.

Reports: Data included in U.S. Geological Survey annual hydrologic data report, "Water Resources Data for Ohio," volumes 1 and 2.

Reports in Progress: Gordon, A. B., and Katzenbach, M. S., Guidelines for use of water-quality monitors: Techniques of Water-Resources Investigations, Book 8, Chapter D1.

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ASSESSMENT OF UNRECLAIMED MINE LAND'S IMPACT
ON SURFACE-WATER QUALITY IN OHIO
(OH051)

Period of Project:
October 1979 to July 1983

Project Leader:
C. J. O. Childress

Cooperator:
Ohio Department of Natural Resources

Purpose: To provide water-quality data for selected areas affected by drainage from unreclaimed mine lands. The work is needed in support of a program by Ohio Department of Natural Resources to develop an abandoned mine reclamation plan in compliance with provisions of the 1977 Surface Mining Control and Reclamation Act (P.L. 95-87).

Progress: Water quality, bed-material quality, and suspended-sediment samples were selectively collected at 276 sites during high- and low-flow conditions between 1980 and 1982.

Reports in Progress: Data included in U.S Geological Survey annual hydrologic data report, "Water Resources Data for Ohio, OH-82. Childress, C. J. O., and Jones, R. L., Water quality of streams draining abandoned surface mine lands in Ohio: Open-File Report.

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FLOOD VOLUME FREQUENCY FROM SMALL DRAINAGE BASINS IN OHIO
(OH056)

Period of Project:
February 1981 to December 1987

Project Leader:
William P. Bartlett, Jr.

Cooperator:
Ohio Department of Transportation

Purpose: To define the magnitude and frequency of flood volumes and to develop a method for deriving a design flow hydrograph from small rural basins in Ohio. The information would be used by planners to design hydraulic structures that safely and economically convey floodflows. Complete hydrograph records for rural Ohio basins are generally lacking.

Progress: Thirty-two sites have been instrumented to collect the rainfall and runoff data required for mathematical model calibration. Data collection has been ongoing since August 1981. Theoretical ratings have been developed for all sites and one site has been equipped with a downstream recorder to accurately define the variable backwater flow.

Reports: Annual peak flows are included in the U. S. Geological Survey annual hydrologic data report, "Water Resources Data for Ohio," volumes 1 and 2.

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CUYAHOGA RIVER QUALITY ASSESSMENT
(OH059)

Period of Project:
May 1981 to September 1981

Project Leader:
C. J. O. Childress

Cooperator:
U. S. National Park Service

Purpose: The Cuyahoga River between Akron and Cleveland, Ohio, was set aside in 1975 for development by the U. S. National Park Service as a national recreation area. The purpose of the project is to assess the existing and potential impacts of basin development alternatives on recreational use of the area.

Progress: Phase I, a review of the literature and work plan for implementing an intensive river-quality assessment, is complete.

A reconnaissance level study of low-flow river quality was conducted over a twenty-four period in September 1982. Biochemical oxygen demand, D.O., temperature, pH, and specific conductance were measured at 4-hour intervals at 86 main stem and tributary sites between Old Portage gage and Independence gage. Fecal bacteria were sampled twice at each site.

Reports in Progress: U.S.G.S. Administrative report, "Surface-Water Quality in the Cuyahoga Valley National Recreation Area -- A Review of the Literature and Proposal for Study."

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LOW-FLOW REGIONALIZATION OF OHIO STREAMS
(OH061)

Statewide

Period of Project
July 1981 to June 1983

Project Leader:
Ronald R. Schwartz

Cooperator:
Ohio Environmental Protection Agency

Purpose (1) To compile the low-flow and basin characteristics of Ohio streams that are not significantly regulated. (2) To utilize this information in regression analysis to obtain estimates of low flow at ungaged sites in Ohio.

Progress: Basin characteristics determined at 128 sites, including the index of relative infiltration. Regression analysis using these basin characteristics as independent variables in progress.

Reports in Progress: Schwartz, R. R., Low-flow regionalization of Ohio streams: U.S. Geological Survey Water-Supply Paper.

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RESEARCH MODELING OF COAL AREAS IN OHIO
(OH063)

Period of Project:
October 1981 to September 1984

Project Leader:
Paul A. Drewes

Cooperator:
U.S Geological Survey

Purpose: (1) To describe the hydrology and land-use practices of two basins in Ohio's coal areas; (2) evaluate impact of different land-use practices; and (3) compare predicted hydrologic parameters of unmined and surface-mined areas and quantify impacts of land-use changes on the hydrology.

Progress: Two basins have been instrumented to collect hydrological data in order to calibrate the Leavesley model. A third site was established in a proposed mined area to determine sediment loads from mixed areas.

Reports in Progress: Drewes, P. A., Hydrologic modeling of surface mined and unmined areas in Ohio.

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ANALYSIS OF SEDIMENT DATA, COAL STATES
(OH064)

Period of Project:
December 1981 to November 1982

Project Leader:
Greg F. Koltun

Cooperator:
Federal Energy

Purpose: To analyze available suspended-sediment data from selected long-term sites throughout the Appalachian coal region, and derive equations to predict annual suspended-sediment loads and/or yields based on land use basin characteristics, and climatic variables. If the data so warrants, annual suspended-sediment yields and/or loads will be regionalized by typical land-use conditions or physiography.

Progress: Collection, tabulation, and analysis of the data has been completed. A report on the analysis is in progress.

Reports in Progress: Koltun, G. F., Prediction of annual suspended-sediment loads on small and medium-sized basins within the Appalachian coal region.

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CHEMICAL CHARACTERISTICS OF BRINES IN EASTERN OHIO
(OH065)

Period of Project:
January 1982 to December 31, 1982

Project Leader:
Clifford G. Angelo

Cooperator:
Ohio Department of Natural Resources
(Division of Oil and Gas)

Purpose: Describe the chemical characteristics of various Ohio brines and categorize them by geologic and geographic occurrence; thus, it may be possible to uniquely identify or "fingerprint" the horizon from which it was derived.

Progress: All sampling was completed, results analyzed and compared to past analysis. Samples from each of three major formations or horizons (Berea, Clinton, and Rose Run) were analyzed for radioactive isotopes as well as common constituents. Ratios using the concentrations data from the individual samples were determined and comparisons made between samples from each formation. These ratios provided the basis for uniquely identifying or "fingerprinting" the horizon from which the brine was derived.

Reports in Progress: Angelo, C. G., and Masters, R. W., Chemical characteristics of brines in eastern Ohio: Water-Resources Investigations.

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GLACIAL VALLEY AQUIFERS IN NORTHEASTERN OHIO (RASA) (OH066)

Period of Project:
March 1982 to (unknown)

Project Leader:
Allan C. Razem

Cooperator:
U.S. Geological Survey

Purpose: To obtain an overview of the available literature and data concerning glacial valley aquifers in northeast Ohio. Assemble and summarize, in outline or map form, the existing literature and data. Prepare proposals for RASA staff evaluation (in Albany, New York) for future studies in glacial valley aquifers. Evaluate existing aquifer test data and determine aquifer properties.

Progress: A report was prepared for the RASA staff in Albany, New York, that contained an annotated bibliography, data search, literature search, and a short description of the glacial aquifers in northeast Ohio.

Reports: None published.

EFFECTS OF LANDFILLS ON WATER QUALITY
SOUTHERN FRANKLIN COUNTY, OHIO
(OH067)

Period of Project:
February 1982 to August 1983

Project Leader:
Jeffrey T. de Roche

Cooperator:
City of Columbus (Division of Water)

Purpose: The primary objective of this project is to identify and chemically characterize any leachate being produced by the landfills. Other objectives include: (1) tracing the contamination to its original source; (2) calculating the rate of travel and width of dispersion of any contamination; and (3) providing a monitoring network of water wells at multiple levels that can be used to detect any deviation in ground-water quality. In addition, other potential sources of contamination in the study area will be investigated.

Progress: Twelve monitoring wells were drilled and developed using sterile techniques. Continuous digital recorders were installed on two wells and monthly water-level measurements are made on an additional 31 wells. Water-quality samples were taken from 19 wells, 3 surface-water sites, and 1 seep and then analyzed for common constituents, metals, and nitrogen species. The bottom sediments of area streams were sampled for organic substances and heavy metals, and additional samples were taken from the water column. Several monitoring wells were also sampled for organic constituents, both in the water column and in the aquifer sediments. Several potentiometric maps have been constructed for the study area.

Reports in Progress: Ground-water levels and water-quality data will be included in U.S. Geological Survey annual hydrologic data report, "Water Resources Data for Ohio," volumes 1 and 2.

de Roche, Jeffrey T., Effects of landfills on water quality, southern Franklin County, Ohio. (Data included in U.S. Geological Survey annual hydrologic data report, "Water Resources Data for Ohio," volumes 1 and 2.)

Reports Published: de Roche, Jeffrey T., and Razem, Allan C., 1981, Ground-water quality in the vicinity of landfill sites, southern Franklin County, Ohio: U.S. Geological Survey Open-File Report 81-919 (Water Resources Investigations).

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SEDIMENTATION IN WHEELING CREEK BASIN, BELMONT COUNTY, OHIO (OH068)

Period of Project
July 1982 to September 1984

Project Leader.
Alban W. Coen, III

Cooperator:
Ohio Department of Natural Resources

Purpose: Recent flooding along Wheeling Creek and its tributaries has caused concern among residents of Belmont County. The flooding could be caused by climatic conditions or by loss of conveyance of the stream channels due to surface mining, or to other reasons.

This study will: (1) determine cause of flooding, (2) determine source areas of sediment and areas of deposition; (3) determine deposition rates in parts of the basin; and (4) establish a discharge and suspended-sediment gaging station near the mouth of Wheeling Creek.

Progress: The gaging station has been installed and is operating. Stream cross-section surveys, measurements and sampling are underway.

Reports in Progress: U.S. Geological Survey open-file report planned; discharge and sediment data to be published in U.S. Geological Survey annual hydrologic data report, "Water Resources Data for Ohio," volume 1.

ESTIMATING FLOOD PEAKS FROM GRAIN SIZE ANALYSIS
AND CHANNEL CHARACTERISTICS
(OH069)

Statewide

Period of Project:
Since May 1982

Project Leader:
Donald K. Roth

Cooperator:
Ohio Department of Transportation

Purpose: (1) To determine if the median grain size is sigificant in the regression analysis for estimating flood peaks from channel characteristics. (2) To develop regression equation to relate channel characteristics to flood peaks for channels with bedrock (rigid) bottoms.

Progress: Using available grain-size analysis and channel-shape characteristics, determine if the median grain size is statistically significant. Collected channel data (median grain size and channel widths) at 30 sites in southern Ohio and at 20 gaged sites with bedrock channels throughout Ohio.

Reports: Webber, E. E., and Roberts, J. W., Floodflow characterization related to channel geometry in Ohio, U.S. Geological Survey Open-File Report 81-1105

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MOVEMENT OF URANIUM THROUGH THE AQUIFER SYSTEM
IN VICINITY OF U.S. DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER, FERNALD, OHIO
(OH070)

Period of Project:
June 1982 to September 1982 (first phase)

Project Leader:
Alan C. Sedam

Cooperator:
U.S. Department of Energy

Purpose: The purpose of first phase is to determine the source of elevated uranium concentrations detected in wells in the vicinity of Fernald, Ohio, and to determine the extent and shape of any existing ground water plume of elevated concentrations of uranium. A next phase would be to determine the rate and direction of ground-water flow and to develop an aquifer simulation model for the affected area.

Progress: First phase completed. Samples from 33 sites were analyzed for dissolved uranium and several were analyzed for other radioactive parameters. Some samples were also analyzed for common ions, metals and organic compounds. Ground-water levels were measured and potentiometric surface map of the area was completed. The data was analyzed and a report is being prepared. Funding has not yet been provided for next phase of this study.

Reports in Progress: Sedam, A. C., Movement of uranium through the aquifer system in vicinity of U.S. Department of Energy Feed Materials Production Center, Fernald, Ohio: Administrative report to cooperator.

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AREAL VARIABILITY OF GROUND-WATER QUALITY
IN OHIO'S COAL-PRODUCING REGIONS
(OH071)

Period of Project:
October 1982 to September 1983

Project Leader:
Allan C. Razem

Cooperator:
U.S Geological Survey

Purpose To sample approximately 100 wells, springs, or seeps in the coal-producing regions of eastern Ohio in order to develop base line data so that impacts of future mining can be evaluated. To build a statistical model to describe the ground-water quality and possibly predict consequences of mining.

Progress: New project.

Reports: Completion report to be written.

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SURFACE WATER QUALITY IN COAL REGION OF OHIO
(OH072)

Period of Project
October 1982 to September 1983

Project Leader:
Janet Hren

Cooperator:
Federal Program (Energy)

Purpose: Compile all base-flow data collected in coal area of Ohio from 1975 through September 1982 in a single report. Define the dominant coal-related land use for about 800 sites in this area. Define the mean and ranges of concentrations for various water-quality parameters for each land-use category. Determine which parameters are significant and useful in defining effects of coal mining activities on surface-water quality.

Progress: Completed preliminary review of USGS water-quality files to determine sites in the coal area where pertinent data was collected. Eight hundred eighty-two sites were selected for coal-related land-use classification. Land-use categories are unmined, abandoned surface mines, reclaimed surface mines, and abandoned deep mines. Land use was determined using the Ohio Department of Natural Resources OCAP abandoned surface-mines/land-use map series and the abandoned underground mine map series. Land use has been determined for all 883 sites.

Reports in Process: Hren, J., and Wilson, K. S., Surface water quality in coal regions of Ohio: U. S. Geological Survey Water-Resources Investigations.

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PART B

HYDROLOGIC DATA COLLECTION STATIONS--EXPLANATION

The tables in Part B list active hydrologic data-collection stations in Ohio. Surface-water stations are numbered and listed in downstream order along the main stem. All stations on a tributary entering above a main-stem station are listed before that station. A station on a tributary entering between two main-stem stations is listed between them. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. The rank of any tributary on which a station is situated with respect to the stream on which it is immediately tributary is indicated by an indention in the list of stations. Each indention represents one rank. This downstream order and system of indention show which stations are on tributaries between any two stations and indicate the rank of the tributary on which each station is situated. This is a permanent numerical designation adopted by the U.S. Geological Survey in 1950.

Surface water stations are classified as: daily discharge, daily stage-only, daily sediment, continuous-recording water-quality, reservoir or lake contents and (or) elevation, precipitation, partial-record peak-discharge, partial-record low-flow discharge, partial-record chemical-quality, partial-record sediment, partial-record biologic, partial-record pesticide, and periodic discharge.

Daily discharge and daily stage-only stations are sites instrumented to provide a continuous stage record. For daily discharge stations, calculations of mean daily discharge, peak flows during floods, and total monthly and yearly runoff are made by applying stage data to a stage-discharge rating curve derived from actual discharge measurements. Periodic discharge measurements are those which are made at nonrecording stations generally in conjunction with miscellaneous data-collection activities.

Pool-elevation data collected daily at reservoir or lake stations are used to determine periodic changes in the amount of water held in storage. Continuous precipitation data, although not published, are collected at a number of sites that have been established to gage peak flows resulting from storm runoff.

Continuous-recording water quality stations are sites equipped to record one or more physical and chemical characteristics. The record is used to determine maximum and minimum daily values.

For daily sediment stations, samples collected daily are analyzed for their suspended-sediment concentration to develop a continuous concentration curve from which daily mean concentrations are determined. Suspended-sediment discharges are computed by multiplying water discharge times concentration times a conversion factor.

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Limited hydrologic data are collected at many sites that are not feasible to operate as daily gaging stations. A partial-record station is any site where a particular type of data is collected on a regular but noncontinuous basis. Frequency of collection may range from one to several times annually. Information types collected at partial record stations may be one or more of the following: peak discharge, low-flow discharge, chemical quality, sediment, biologic, and pesticides.

In addition to information collected at the stations listed in table 1, measurements of discharge and water-quality data have been collected for specific purposes at many other locations in the state. This information is available upon request.

Table 2 lists the ground-water stations in Ohio from which the U.S. Geological Survey regularly collects ground-water-level and ground-water-quality data. The well numbering system of the U.S. Geological Survey is based on the grid system of latitude and longitude. The number consists of 15 digits. The first 6 digits denote the degrees, minutes, and seconds of latitude, and the next 7 digits denote the degrees, minutes, and seconds of longitude. The last 2 digits are numbered sequentially for wells within a 1-second grid. The system provides the geographic location of the well and a unique number for each well.

In addition to the sites listed in table 2, measurements of water-level, yield, and chemical analyses of ground-water have been collected at many other locations in the state. Further information is available upon request.

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Table 1.--Surface-water hydrologic data stations maintained by the U.S. Geological Survey in cooperation with other agencies

Station No.	Station	Type of Data a/	Project b/
	OHIO RIVER BASIN		
	Ohio River:		
	BEAVER RIVER BASIN		
03086500	Mahoning R (head of Beaver R) at Alliance	D	1
03090000	Berlin Lk nr Berlin Center	R	1
03090500	Mahoning R bl Berlin Dam, nr Berlin Center	D	1
03091000	Milton Re at Pricetown	R	1
03091500	Mahoning R at Pricetown	D	1
03092000	Kale C nr Pricetown	D	1
03092090	W B Mahoning R nr Ravenna	D	1
03092450	Michael J. Kirwan Re	R	1
03092460	W B Mahoning R bl M. J. Kirwan Dam, at Wayland	D	1
03093000	Eagle C at Phalanx Station	D	1
03094000	Mahoning R at Leavittsburg	D	1
	Mosquito Creek:		
03095000	Mosquito C Lake nr Cortland	R	1
03095500	Mosquito C bl Mosquito C Dam, nr Cortland	D	1
03097000	Meander C Re at Mineral Ridge	R	1
	Mill Creek:		
	Sawmill Run:		
03098350	Charles D at Boardman	CpPr	28
03098500	Mill C at Youngstown	G	1
03099500	Mahoning R at Lowellville	D	1
03099510	Mahoning R at Oh-Pa State line bl Lowellville	M	42
	Shenago River:		
03102950	Pymatuning C at Kinsman	D	1
03108980	N F L Beaver C (head of L Beaver C) nr Salem	Lp	16
03108990	L B M F Little Beaver C at Leetonia	Lp	16
03109150	W F Little Beaver C at Guilford	Lp	16
03109500	L Beaver C nr East Liverpool	D	1
	YELLOW CREEK BASIN		
03110000	Yellow C nr Hammondsville	D	1
	CROSS CREEK BASIN		
	McIntyre Creek:		
03110980	Console Rn at Bloomingdale	Cp	34
	SHORT CREEK BASIN		
	Short Creek:		
	South Fork Short Creek:		
03111450	Branson Rn at Georgetown	Cp	34
03111455	S F Short C at Georgetown	Cp	34
	Piney Fork:		
03111470	L Piney F at Parlett	Cp	34
03111490	Piney F tr nr Piney Fork	Cp	34
03111500	Short C nr Dillonvale	D	1

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Table 1.--Surface-water hydrologic data stations maintained by the U.S. Geological Survey in cooperation with other agencies--Continued

Station No.	Station	Type of Data a/	Project b/
	WHEELING CREEK BASIN		
	Wheeling Creek:		
	Sloan Run:		
03111540	Sloan Rn tr nr Harrisville	Cp	34
03111548	Wheeling C bl Blaine	Ds	68
	CAPTINA CREEK BASIN		
03113802	Chestnut C nr Barnesville	CpPr	56
03114000	Captina C at Armstrong Mills	D	1
	SUNFISH CREEK BASIN		
	Sunfish Creek:		
03114240	Wood Rn nr Woodsfield	Cp	34
	LITTLE MUSKINGUM RIVER BASIN		
	Little Muskingum River:		
	Witten Fork:		
03115280	Trail Rn nr Antioch	Cp	34
03115410	Graham Rn nr Bloomfield	Cp	34
03115510	Moss Rn nr Wingett	Cp	34
	DUCK CREEK BASIN		
	East Fork Duck Creek (head of Duck Creek):		
03115596	Barnes Rn at Summerfield	CpPr	56
	West Fork Duck Creek:		
	Buffalo Run:		
03115710	Buffalo Rn tr nr Dexter City	Cp	34
	MUSKINGUM RIVER BASIN		
	River Styx:		
	Holmes Brook:		
03116150	Orchard Rn at Wadsworth	CpPr	28
03117000	Tuscarawas R at Massillon	D	1
03117100	Tuscarawas R at Navarre	M	42
03117500	Sandy C at Waynesburg	D	1
03118000	M B Nimishillen C at Canton	D	1
03118500	Nimishillen C at North Industry	D	1
03119500	Bolivar Re at Bolivar	R	1
	McGuire Creek:		
03120000	Leesville Lk nr Leesville	R	1
03120500	McGuire C bl Leesville Dam, nr Leesville	D	1
03120580	Falling B at Sherrodsville	CpPr	56
	Indian Fork:		
03121000	Atwood Lk nr New Cumberland	R	1
03122000	Dover Lk nr Dover	R	1
03122500	Tuscarawas R bl Dover Dam, nr Dover	D	1
	South Fork Sugar Creek:		
03123060	Cattail C at Baltic	CpPr	56
03123400	Dundee C at Dundee	CpPr	1,56
03123500	Beach City Lk nr Beach City	R	1
03124000	Sugar C bl Beach City Dam, nr Beach City	D	1
03124500	Sugar C at Strasburg	D	1

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Table 1.--Surface-water hydrologic data stations maintained by the U.S. Geological Survey in cooperation with other agencies--Continued

Station No.	Station	Type of Data a/	Project b/
	Stillwater Creek:		
	Stillwater Creek tributary:		
03125450	Robinson Rn nr Hendrysburg	Cp	34
03125500	Piedmont Lk at Piedmont	R	1
03126000	Stillwater C at Piedmont	D	1
	Brushy Fork:		
03126500	Clendening Lk at Tippecanoe	R	1
03127000	Stillwater C at Tippecanoe	D	1
03127500	Stillwater C at Uhrichsville	D	1
	Clear Fork (head of) L Stillwater Creek:		
03127950	Clear F nr Jewett	Cp	34
03128000	Tappan Lk at Tappan	R	1
03128500	L Stillwater C bl Tappan Dam, at Tappan	D	1
	Mud Run:		
03128650	Mud Rn tr at Wainwright	Cp	34
03129000	Tuscarawas R at Newcomerstown	D	1
03129400	Black F ab Charles Mill Dam, nr Mifflin	G	1
03129500	Charles Mill Lk nr Mifflin	R	1
03130000	Black F bl Charles Mill Dam, nr Mifflin	D	1
03131300	Black F at Melco	G	1
03131500	Black F at Loudonville	D	1
03133000	Pleasant Hill Lk nr Perrysville	R	1
03133500	Clear F bl Pleasant Hill Dam nr Perrysville	D	1
	Mohican R (continuation of Black Fork):		
	Lake Fork:		
03134500	Mohicanville Re nr Mohicanville	R	1
03135000	L F bl Mohicanville Dam, nr Mohicanville	D	1
03136235	Kokosing R nr Mount Vernon	Lp	16
03136300	N B Kokosing R Lk nr Fredericktown	R	1
03136500	Kokosing R at Mount Vernon	D	1
03138000	Mohawk Re nr Nellie	R	1
03138500	Walhonding R (continuation of Mohican R) bl Mohawk Dam, at Nellie	D	1
03138910	Salt C at Holmesville	Lp	16
03139000	Killbuck C at Killbuck	D	1
03140000	Mill C nr Coshocton	D	1
03140500	Muskingum R (continuation of Tuscarawas R) nr Coshocton	D	1
	Wills Creek:		
	Seneca Fork:		
03141000	Senecaville Lk nr Senecaville	R	1
03141500	Seneca F bl Senecaville Dam, nr Senecaville	D	1
03141700	Wills C at Derwent	G	1
03142000	Wills C at Cambridge	DM	1
03142290	Salt F Re nr Cambridge	R	1
03143000	Wills C Lk nr Wills Creek	R	1
03143500	Wills C bl Wills C Dam, at Wills Creek	D	1

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Table 1.--Surface-water hydrologic data stations maintained by the U.S. Geological Survey in cooperation with other agencies--Continued

Station No.	Station	Type of Data a/	Project b/
03144000	Wakatomika C nr Frazeysburg	D	1
03144500	Muskingum R at Dresden	D	1
03144830	S F Licking R nr Millersport	Lp	16
03144865	Slim C at Kirkersville	CpPr	56
03145000	S F Licking R nr Hebron	D	1
03146500	Licking R nr Newark	D	1
03147300	Dillon Lk nr Dillon Falls	R	1
03147500	Licking R bl Dillon Dam, nr Dillon Falls	D	1
03148000	Muskingum R at Zanesville	G	1
03148300	Moxahala C at Roseville	Cp	1
03148395	Claypit C nr Roseville	CpPr	56
03150000	Muskingum R at McConnelsville	DBpPpSQp	1,3,4
03150602	Second C nr Marietta	CpPr	56
	HOCKING RIVER BASIN		
03156550	Rush C nr Junction City	Lp	16
03156900	Clear C at Clearport	Lp	16
03157000	Clear C nr Rockbridge	D	1
03157500	Hocking R at Enterprise	D	1
03158102	Wolfkin Rn at Haydenville	CpPr	56
03158220	Glen Rn nr Doanville	Cp	34
	Sunday Creek:		
	East Branch Sunday Creek:		
03158500	Burr Oak Re at Burr Oak	R	1
03158510	Sunday C nr Burr Oak	G	1
03159000	Sunday C at Glouster	G	1
	Sugar Creek:		
03159450	Mill C nr Chauncey	Cp	34
03159500	Hocking R at Athens	G	1
03159503	Home D on STP Rd at Athens	CpPr	28
03159510	Hocking R bl Athens	DPpBpQp	1,3
	SHADE RIVER BASIN		
03159536	W B Shade R (head of Shade R) at Chester	Lp	16
03159537	Lik Rn nr Alfred	CpPr	56
03159538	M B Shade R at Chester	Lp	16
03159540	Shade R nr Chester	D	1
	RACCOON CREEK BASIN		
	W B Raccoon C (head of Raccoon C):		
	East Branch Raccoon Creek:		
03201550	Starr Rn nr New Plymouth	Cp	34
	Raccoon Creek:		
03201600	Sandy Rn ab Big Four Hollow C nr Lake Hope	DSpQpPr	1,40
03201660	Big Four Hollow C bl E F nr Lake Hope	DQpSp	40
03201700	Big Four Hollow C nr Lake Hope	DMSQp	40
03201720	Hull Hollow C nr Lake Hope	DQpSp	40
03201722	Sandy Rn bl Hull C nr Lake Hope	Qp	40
03202000	Raccoon C at Adamsville	DM	1,42

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Table 1.--Surface-water hydrologic data stations maintained by the U.S. Geological Survey in cooperation with other agencies--Continued

Station No.	Station	Type of Data a/	Project b/
	SANDUSKY CREEK BASIN		
03205995	Sandusky C nr Burlington	CpPr	34,56
	SCIOTO RIVER BASIN		
03219500	Scioto R nr Prospect	D	1
03219520	Fulton C nr Radnor	Lp	16
03219590	Bokes C nr Warrensburg	D	1
03219770	Mill C nr Broadway	Lp	16
03219849	Scott C nr Marysville	CpPr	56
03220000	Mill C nr Bellepoint	D	1
03220500	O'Shaughnessy Re nr Dublin	R	1
03221000	Scioto R bl O'Shaughnessy Dam nr Dublin	D	1
03221500	Griggs Re nr Columbus	R	1
	Olentangy River:		
03222700	Mud Rn nr Caledonia	Lp	16
03222800	Flat Rn nr Caledonia	Lp	16
03223000	Olentangy R at Claridon	D	1
03223330	March Rn nr West Point	CpPr	56
03225000	Delaware Lk nr Delaware	R	1
03225500	Olentangy R nr Delaware	D	1
03226800	Olentangy R nr Worthington	DSQpPr	1,38
03226855	Dublin-Granville Rd C at Worthington	FSpPr	38
03226860	Rush Rn nr Worthington	CpPr	28
03226865	Rush Rn at Worthington	DSQp	38
03226870	Linworth Rd C at Columbus	DSQpPr	38
03226872	Unnamed tr to Olentangy R at Columbus	FSpPr	38
03226875	Bethel Rd C at Columbus	DSQpPr	38
03226885	Olentangy R at Henderson Rd at Columbus	DSQpPr	38
03226890	Turkey Rn at Upper Arlington	CpPrQp	1,28
03227500	Scioto R at Columbus	D	1
03228400	Hoover Re at Central College	R	1
03228500	Big Walnut C at Central College	D	1
03228690	Blacklick C nr Brice	Lp	16
03228804	Alum C Lk nr Worthington	R	1
03228805	Alum C at Africa	D	1
03229000	Alum C at Columbus	D	1
03229500	Big Walnut C at Rees	DQp	1
03229770	Walnut C nr Groveport	Lp	16
03230230	Big Darby C nr West Jefferson	Lp	16
03230250	L Darby C nr Irwin	Lp	16
03230310	L Darby C at West Jefferson	Lp	16
03230500	Big Darby C at Darbyville	D	1
03230700	Scioto R at Circleville	G	1
03230890	Deer C Lk nr Pancoastburg	R	1
03230900	Deer C nr Pancoastburg	D	1
03231000	Deer C at Williamsport	D	1
03231500	Scioto R at Chillicothe	DM	1

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Table 1.--Surface-water hydrologic data stations maintained by the U.S. Geological Survey in cooperation with other agencies--Continued

Station No.	Station	Type of Data a/	Project b/
	Paint Creek:		
03231800	Sugar C nr Rock Mills	Lp	16
03232460	Paint C Lk nr Bainbridge	R	1
03232470	Paint C bl Paint C Dam nr Bainbridge	D	1
	Rocky Fork:		
03232480	Clear C nr Hillsboro	Lp	16
03232500	Rocky F nr Barretts Mills	D	1
03234000	Paint C nr Bourneville	D	1
03234500	Scioto R at Higby	DMQpBp	1,3,42
	Salt Creek:		
	Beech Fork:		
03235080	Bull C nr Adelphi	CpPr	34,56
03236055	M F Salt C nr Richmondale	Lp	16
	Little Salt Creek:		
03236090	S B L Salt C nr Jackson	Cp	34
03236600	L Salt C nr Richmondale	Lp	16
03237095	Devers Rn at Lucasville	Cp	34
03237120	Stone B nr Peebles	CpPr	56
03237198	Duncan Hollow C nr McDermott	CpPr	56
	UPPER TWIN CREEK BASIN		
03237280	Upper Twin C at McGaw	DSpPpPrQp	1,3,4
	OHIO BRUSH CREEK BASIN		
03237315	Elk F at Winchester	CpPr	56
03237500	Ohio Brush C nr West Union	D	1
	WHITEOAK CREEK BASIN		
03238285	Sugar Rn nr New Market	CpPr	56
03238500	Whiteoak C nr Georgetown	D	1
	FOURMILE CREEK BASIN		
	Fourmile Creek:		
03238790	Anderson D at Maycliff Place, Cincinnati	CpPr	28
	LITTLE MIAMI RIVER BASIN		
03238950	L Miami R nr S Charleston	Lp	16
03240000	L Miami R nr Oldtown	D	1
03241500	Massies C at Wilberforce	D	1
	Beaver Creek:		
03241890	L Beaver C at Alpha	Lp	16
	Sugar Creek:		
03241960	L Sugar C at Bellbrook	Lp	16
03241990	Sugar C nr Bellbrook	Lp	16
03241994	Twist Rn at Xenia	CpPr	56
03242050	L Miami R nr Spring Valley	D	1
03242150	Caesar C nr Xenia	D	1
03242200	Anderson F nr New Burlington	D	1
03242340	Caesar C Lk nr Wellman	R	1
03243850	Todd F at Clarksville	Lp	16

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Table 1.--Surface-water hydrologic data stations maintained by the U.S. Geological Survey in cooperation with other agencies--Continued

Station No.	Station	Type of Data a/	Project b/
	Turtle Creek:		
03244550	L Muddy C nr Lebanon	Lp	16
03244570	Turtle C at S Lebanon	Lp	16
03244950	O'Bannon C at Loveland	Lp	16
03245500	L Miami R at Milford	DMQpSBp	1,3,4,42
03246200	E F L Miami R nr Marathon	D	1
03247040	Wm. H. Harsha Lk nr Bantam	R	1
03247050	E F L Miami R nr Batavia	D	1
03247500	E F L Miami R at Perintown	D	1
	MIAMI CREEK BASIN		
03255500	Mill C at Reading	D	1
	West Fork Mill Creek:		
03256500	W F Mill C Lk nr Greenhills	R	1
03257500	W F Mill C at Woodlawn	D	1
03258520	Amberly D on Hudson Parkway nr Cincinnati	CpPr	28
03259000	Mill C at Carthage	D	1
	Congress Run:		
03259050	Wyoming D on Oregon Trail at Wyoming	CpPr	28
	RAPID RUN BASIN		
	Rapid Run:		
	Wulff Run:		
	Unnamed tributary:		
03260095	Delhi D on Cannas Rd nr Cincinnati	CpPr	28
	GREAT MIAMI RIVER BASIN		
	G Miami River:		
03260700	Bokengehalas C nr De Graff	D	1
03261500	G Miami R at Sidney	D	1
03261700	Loramie C nr McCartyville	Lp	16
03261950	Loramie C nr Newport	D	1
03262000	Loramie C at Lockington	D	1
03262700	G Miami R at Troy	D	1
03263000	G Miami R at Taylorsville	D	1
	Stillwater River:		
03263171	Harte Rn nr Greenville	CpPr	56
03264000	Greenville C nr Bradford	D	1
03265000	Stillwater R at Pleasant Hill	D	1
03265395	Ludlow C at Ludlow Falls	Lp	16
03266000	Stillwater R at Englewood	D	1
03267000	Mad R nr Urbana	D	1
03267435	Kitty C at Terre Haute	CpPr	56
03267900	Mad R (at St. Paris Pike) at Eagle City	D	1
03268090	C J Brown Re nr Springfield	R	1
03268500	Beaver C nr Springfield	G	1
03269000	Buck C at Springfield	G	1
03269500	Mad R nr Springfield	D	1
03270000	Mad R nr Dayton	D	1

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Table 1.--Surface-water hydrologic data stations maintained by the U.S. Geological Survey in cooperation with other agencies--Continued

Station No.		Station	Type of Data a/	Project b/
03270500	G	Miami R at Dayton	D	1
03270800		Wolf C at Trotwood	D	1
03271500	G	Miami R at Miamisburg	D	1
03271510	G	Miami R nr Linden Ave at Miamisburg	M	42
03271800		Twin C nr Ingomar	D	1
03272000		Twin C nr Germantown	D	1
		Fourmile Creek:		
		Sevenmile Creek:		
03272695		Trippetts B at Camden	CpPr	34,56
03272700		Sevenmile C at Camden	D	1
03274000	G	Miami at Hamilton	D	1
		Indian Creek:		
		Reserve Run:		
03274600	G	Miami R at New Baltimore	QpSpBpPp	3,4

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Table 1.--Surface-water hydrologic data stations maintained by the U.S. Geological Survey in cooperation with other agencies--Continued

Station No.	Station	Type of Data a/	Project b/
	ST LAWRENCE RIVER BASIN		
	STREAMS TRIBUTARY TO LAKE ERIE		
	Halfway Creek:		
	Silver Creek:		
04176870	Ketcham D at Rowland Rd, Toledo	CpPr	28
04176880	Silver C at Jackman Rd, Toledo	CpPr	28
	Shantee Creek:		
04176890	Tifft D at Fox Glove Rd, Toledo	CpPr	28
04177000	Ottawa R at Toledo University	D	1
	Maumee River:		
04180907	Carter C nr New Bremen	CpPr	56
	North Fork Gordon Creek (head of Gordon Creek):		
	Middle Fork Gordon Creek:		
04183750	M F Gordon C tr at Hicksville	CpPr	34,56
	Deer Creek:		
04184750	Spring C at Fayette	Cp	34
04184760	Bean C tr nr Fayette	Cp	34
04185000	Tiffin R at Stryker	D	1
	Beaver Creek:		
04185150	Beaver C tr nr Montpelier	Cp	34
	Auglaize River:		
04185795	Auglaize River nr Uniopolis	Lp	16
04185945	Auglaize R tr nr Spencerville	Cp	34
04186500	Auglaize R nr Ft Jennings	D	1
	Hog Creek:		
	Little Hog Creek:		
04186800	King Rn nr Harrod	CpPr	56
04187700	Pike Rn at Lima	CpPr	28
	Sugar Creek:		
04187945	Rattlesnake C nr Cairo	Cp	34
04189000	Blanchard R nr Findlay	D	1
	Little Auglaize River:		
04190350	L Auglaize R tr at Ottoville	Cp	34
04191003	Stripe C nr Van Wert	CpPr	56
04191480	Deetree Rn nr Junction	Cp	34
04191500	Auglaize R nr Defiance	D	1
04192500	Maumee R nr Defiance	D	1
04192650	N Turkeyfoot C nr Liberty Center	Lp	16
04192900	Reitz Rn at Waterville	CpPr	56
04193490	Maumee R nr Waterville	M	42
04193500	Maumee R at Waterville	DQpBpS	1,3,4
04193900	Grassy C at Perrysburg	CpPr	28
04194107	Lake Erie at Reno Beach	G	1
04195500	Portage R at Woodville	D	1
04195950	Paramour C (head of Sandusky R) nr Leesville	Lp	16

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Table 1.--Surface-water hydrologic data stations maintained by the U.S. Geological Survey in cooperation with other agencies--Continued

Station No.	Station	Type of Data a/	Project b/
04195970	Sandusky R nr North Robinson	Lp	16
04196800	Tymochtee C at Crawford	D	1
04196825	Browns Rn nr Crawford	CpPr	56
04197020	Honey C nr New Washington	D	1
04197100	Honey C at Melmore	D	1
04197170	Rock C at Tiffin	D	1
04198000	Sandusky R nr Fremont	DQpBpS	1,3,4
04198007	Muskellunge C nr Fremont	Lp	16
	West Branch Huron River:		
04198019	Sandhill C nr Monroeville	CpPr	56
04199160	Old Woman's C ab bridge at Huron	G	1
04199165	Old Woman's C bl bridge at Huron	G	1
04199170	Old Woman's C at Lk at Huron	G	1
04199550	Beaver C at Amherst	Lp	16
04200430	W B Black R ab Lk St at Elyria	DS	1
04200500	Black R at Elyria	DS	1
04200550	Black R bl Elyria	M	42
04200800	Glen Park C at Bay Village	CpPr	28
	West Branch Rocky River:		
04201302	Delwood Rn at Valley City	CpPr	56
04201498	E B Rocky R nr Berea	Lp	16
04201500	Rocky R nr Berea	D	1
	CUYAHOGA RIVER BASIN		
04201895	Fire Rn at Auburn Corners	CpPr	56
04202000	Cuyahoga R at Hiram Rapids	D	1
04206000	Cuyahoga R at Old Portage	DM	1,42
04207110	Tinkers C tr at Twinsburg	CpPr	28
04207200	Tinkers C at Bedford	D	1
04208000	Cuyahoga R at Independence	DMPpSQpBp	1,3,4,42
04208502	Big C at Cleveland	D	1
04208506	Cuyahoga R at W 3rd St bridge in Cleveland	M	42
	Doan Brook:		
04208580	N F Doan Bk at Shaker Heights	CpPr	28
	GRAND RIVER BASIN		
04209000	Chagrin R at Willoughby	D	1
04210100	Hoskins C at Hartsgrove	CpPr	56
04212100	Grand R nr Painesville	DS	1,4
04212200	Grand R at Painesville	QpBpSp	3
04213000	Conneaut C at Conneaut	DQp	1

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Table 1.--Surface-water hydrologic data stations maintained by the U.S. Geological Survey in cooperation with other agencies--Continued

FOOTNOTES

a/

D	Daily discharge station
G	Daily stage-only station
M	Continuous-recording water-quality station
R	Reservoir or lake contents and/or elevation station
S	Daily Sediment
Pr	Precipitation
Cp	Partial-record peak-discharge station
Lp	Partial-record low-flow discharge station
Qp	Partial-record chemical-quality station
Sp	Partial-record sediment station
Bp	Partial-record biologic station
Pp	Partial-record pesticide station
F	Periodic discharge measurements

b/

1	OH 00-001	Surface-water stations
3	OH 00-003	Water-quality stations
4	OH 74-004	Sediment stations
16	OH 72-016	Lowflow characteristics of Ohio streams
28	OH 75-028	Urban hydrology
34	OH 77-034	Floods in northwestern Ohio and strip-mine areas
38	OH 78-038	Highway 315 sediment study
39	OH 79-039	Sediment movement strip-mine areas
40	OH 78-040	Mine reclamation Lake Hope basin
41	OH 79-041	Coal mining impact in Ohio
42	OH 79-042	Water-quality monitor network
56	OH 80-056	Flood Volumes Study
67	OH 80-067	Landfill Impacts

STANDARD ABBREVIATIONS

AB	Above	DI	Distributary	P	Pond
B	Branch	E	East	PR	Prong
BA	Bayou	ES	Estuary	R	River
BK	Brook	F	Fork	RE	Reservoir
BL	Below	G	Great	RN	Run
C	Creek	L	Little	S	South
CA	Canal	LK	Lake	SL	Slough
CL	Coulee	M	Middle	TR	Tributary
D	Ditch	N	North	W	West
		NR	Near		

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Table 2.--Ground-water hydrologic data stations maintained by the U.S. Geological Survey in cooperation with other agencies

Well No.	Well Location	Aquifer	Data available a/	Project b/
390359083015100	Pi-2, Goodyear Atomic Corp., 1 mile west of Piketon, Pike County.	Sand and gravel	GGphQp	2
391748084393800	H-19, Southwestern Ohio Water Co., Ross, Hamilton County.	Sand and gravel	Qp	3
391817084393300	H-4, Southwestern Ohio Water Co., 1 mile south of Ross, Hamilton County.	Sand and gravel	GGphQp	2
392445084333000	Bu-36, Champion Paper Co., Hamilton, Butler County.	Sand and gravel	Qp	3
393853084170700	Mt-63, Box Board Co., Miamisburg, Montgomery County.	Sand and gravel	Qp	3
394025084162800	Mt-49, Metal Shredders, Inc., Whitfield, Montgomery County.	Sand and gravel	GGphQp	2
395118082573300	Fr-3, R. Hann, 1 mile south of Rees, Franklin County.	Sand and gravel	GGphQp	2
395157083003500	Fr-109, City of Columbus south well field, 1 mile south of Columbus, Franklin County.	Sand and gravel	GGphQpAc	2
395804081593200	Mu-1a, Zanesville Water Dept., 1 mile north of Zanesville, Muskingum County.	Sand and gravel	GGphQp	2
400208084112900	Mi-44, Troy Municipal Well, Troy, Miami County.	Sand and gravel	Qp	3

See footnotes at end of table.

Table 2.--Ground-water hydrologic data stations maintained by the U.S. Geological Survey in cooperation with other agencies

Well No.	Well Location	Aquifer	Data available a/	Project b/
401826083255200	U-4, M. Keirns, 1 mile southeast of Peoria, Union county.	Limestone of Silurian Age	GGphQpAc	2
403207081293800	Tu-3, Dover Water Dept., Dover, Tuscarawas County.	Sand and gravel	GGphQp	2
403413083170500	Mn-4, State of Ohio, Big Island Wildlife Area, 2 miles southeast of New Bloomington, Marion Cty.	Limestone of Silurian Age	GGphQpAc	2
411914083045300	S-3, H. Keiser, 2 miles southeast of Fremont, Sandusky County.	Limestone of Silurian Age	GGphQpAc	2
412123083574000	Hy-2, L. Johnson, 2 miles southwest of McClure, Henry County.	Limestone of Silurian Age	GGphQpAc	2
412518081221500	Ge-3a, City of Chagrin Falls 1.2 miles southeast of Chagrin Falls, in Geauga County.	Sandstone of Pennsylvanian Age	G	2

a/ G Daily stage-only station
Gph Geophysical logs
Qp Partial-record chemical-quality
Ac Aquifer characteristics

b/ 2 OH-002 Ground-water stations
3 OH-003 Water-quality stations

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PART C -- SELECTED REFERENCES ON OHIO HYDROLOGY

Selected references on water resources in Ohio are listed below; many of them are available for inspection at one of the offices shown on the title page and at larger public and university libraries. The publications are grouped as follows: (1) U.S. Geological Survey publications; (2) reports prepared by the Geological Survey in cooperation with specific agencies and which can be obtained from the cooperating agencies; and (3) other publications, such as contributions to technical journals.

PROFESSONAL PAPERS

511 Geology and ground-water resources of Portage County, Ohio, by J. D. Winslow and G. W. White. 1966.

605-A Ground water hydrology and geology of the lower Great Miami River valley, Ohio, by A. M. Spieker. 1968.

605-B Seismic refraction survey of Pleistocene drainage channels in the lower Great Miami River valley, Ohio, by J. S. Watkins and A. M. Spieker. 1971.

605-C Effects of increased pumping of ground water in the Fairfield-New Baltimore area (Hamilton County), Ohio--A prediction by analog-model study, by A. M. Spieker. 1968.

605-D Future development of the ground-water resources in the lower Great Miami River valley, Ohio--Problems and alternative solutions, by A. M. Spieker. 1968.

700-D The effect of stream discharge on streambed leakage to a glacial outwash aquifer, by S. E. Norris, in Geological Survey Research 1970, Chapter D, p. D262-D265. 1970.

750-B Availability of ground water from limestone and dolomite aquifers in northwest Ohio and its relation to geologic structure, by S. E. Norris and R. E. Fidler, in Geological Survey Research 1971, Chapter B, p. B229-B235. 1971.

750-C Carbonate equilibria distribution and its relation to an area of high ground-water yield in northwest Ohio, by S. E. Norris and R. E. Fidler, in Geological Survey Research 1971, Chapter C, P. C202-C206. 1971.

750-D Resistivity and neutron logging in Silurian dolomite of northwest Ohio, by L. M. MacCary, in Geological Survey Research 1971, Chapter D, p. D190-D197. 1971.

813-A Summary appraisals of the Nation's ground-water resources--Ohio Region, by R. M. Bloyd, Jr. 1974.

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813-J Summary appraisals of the Nation's ground-water resources--Great Lakes Region, by W. G. Weist, Jr. 1978.

WATER-SUPPLY PAPERS

334 The Ohio Valley flood of March-April, 1913, including comparisons with some earlier floods, by A. H. Horton and H. J. Jackson. 1913.

800 The floods of March 1936--Part 3, Potomac, James, and upper Ohio Rivers, by N. C. Grover, with a section on Weather associated with the floods of March 1936, by Stephen Lichtblau. 1937.

838 Floods of Ohio and Misissippi Rivers, January-February 1937, by N. C. Grover, with a section on Flood deposits of the Ohio River, January-February 1937, by G. R. Mansfield. 1938.

869 Flood of August 1935 in the Muskingum River basin, Ohio, by C. V. Youngquist and W. B. Langbein. 1941.

999 Ground-water resources of the Cincinnati area, Butler and Hamilton Counties, Ohio, by F. H. Klaer, Jr., and D. G. Thompson. 1948.

1460-E Geological and geophysical study of the preglacial Teays Valleys in west-central Ohio, by S. E. Norris and H. C. Spicer. 1958.

1619-A Hydrogeology of a spring in a glacial terrane near Ashland, Ohio, by S. E. Norris. 1963.

1750-A Floods of January-February 1959 in Ohio and adjacent states, by E. L. Hendricks. 1964.

1798-I Fluvial sediment in Hocking River subwatershed 1 (North Branch Hunters Run, Hocking County), Ohio, by R. F. Flint. 1972.

1808 The ground-water resources of the Dayton area (Montgomery County), Ohio, by S. E. Norris and A. M. Spieker. 1966.

1840-A Floods of March 1964 along the Ohio River, by H. C. Beaber and J. O. Rostvedt. 1965.

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1859-C Analysis of water quality of the Mahoning River in Ohio, by G. A. Bednar, C. R. Collier, and W. P. Cross. 1968.

1872 Hydrogeology of Scioto River valley near Piketon (Pike County), Ohio, by S. E. Norris and R. E. Fidler. 1969.

1893 Potential development and recharge of ground water in Mill Creek valley, Butler and Hamilton Counties, Ohio, by R. E. Fidler. 1970.

2045 Fluvial sediment in Ohio, by P. W. Anttila and R. L. Tobin. 1978.

BULLETINS

1133-A Geology and hydrology of the Piqua area (Miami County), Ohio, by S. E. Norris and A. M. Spieker. 1961.

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177 Water resources of the Mahoning River basin, Ohio, with special reference to the Youngstown area, by W. P. Cross, M. E. Schroeder, and S. E. Norris. 1952.

340 Water resources of the Wheeling-Steubenville area, West Virginia and Ohio, by R. C. Smith, W. L. Doll, and Garland Stratton. 1955.

418 Floods of January-February 1959 in Ohio, by W. P. Cross and H. P. Brooks. 1959.

526 Stream quality in Appalachia as related to coal-mine drainage, 1965, by J. E. Biesecker and J. R. George. 1966.

546 Time of travel of water in the Great Miami River, Dayton to Cleves, Ohio, by D. P. Bauer. 1968.

719 The National Stream Quality Accounting Network (NASQAN)--Some questions and answers, by J. F. Ficke and R. O. Hawkinson. 1975.

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Norris, S. E., 1974, Regional flow system and ground-water quality in western Ohio: U.S. Geological Survey Journal of Research, v. 2, no. 5, p. 527-531.

HYDROLOGIC INVESTIGATIONS ATLASES

40 Floods at Mount Vernon (Knox County), Ohio, by G. W. Edelen, Jr., F. H. Ruggles, Jr., and W. P. Cross. 1961 (revised 1964).

43 Floods at Springfield (Clark County), Ohio, in 1913 and 1959, by G. W. Edelen, Jr., F. H. Ruggles, Jr., and W. P. Cross. 1961.

44 Floods at Newark (Licking County), Ohio, by G. W. Edelen, Jr., F. H. Ruggles, Jr., and W. P. Cross. 1961 (revised 1964).

45 Floods at Chillicothe (Ross County), Ohio, by G. W. Edelen, Jr., F. H. Ruggles, Jr., and W. P. Cross. 1964.

46 Floods at Zanesville (Muskingum County), Ohio, by G. W. Edelen, Jr., F. H. Ruggles, Jr., and W. P. Cross. 1964.

47 Floods at Fremont (Sandusky County), Ohio, by G. W. Edelen, Jr., F. H. Ruggles, Jr., and W. P. Cross. 1962.

48 Floods at Circleville (Pickaway County), Ohio, by G. W. Edelen, Jr., F. H. Ruggles, Jr., and W. P. Cross. 1964.

49 Floods at Barberton (Summit County), Ohio, by G. W. Edelen, Jr., F. H. Ruggles, Jr., and W. P. Cross. 1962.

50 Floods at Canton (Stark County), Ohio, by G. W. Edelen, Jr., W. P. Somers, and W. P. Cross. 1962.

51 Floods at Warren (Trumbull County), Ohio, by G. W. Edelen, Jr., F. H. Ruggles, Jr., and W. P. Cross. 1963.

52 Floods at Columbus (Franklin County), Ohio, by G. W. Edelen, Jr., F. H. Ruggles, Jr., W. P. Somers, and W. P. Cross. 1962.

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56 Floods on Crab Creek at Youngstown (Mahoning County), Ohio, by G. W. Edelen, Jr., W. P. Cross, and W. P. Somers. 1963.

198 Water resources of the Appalachian Region, Pennsylvania to Alabama, by W. J. Schneider and others. 1965.

295 Ground-water resources of the Appalachian region, by G. G. Wyrick. 1968.

324 Floods at Amesville (Athens County), Ohio, by R. I Mayo and E. E. Webber. 1969.

325 Floods at Jackson (Jackson County), Ohio, by E. E. Webber and R. I. Mayo. 1968.

341 Hydrogeology of the Berea and Cussewago Sandstones in northeastern Ohio, by J. L. Rau. 1969.

366 Saline ground-water resources of Ohio, by A. C. Sedam and R. B. Stein. 1970.

494 Hydrogeology of the Pottsville Formation in northeastern Ohio, by A. C. Sedam. 1973.

MISCELLANEOUS INVESTIGATIONS SERIES

316 Glacial map of Ohio, by R. P. Goldthwait, G. W. White, and J. L. Forsyth. 1961 (revised in part, 1967).

HYDROLOGIC UNIT MAP

U.S. Geological Survey, 1974, Hydrologic unit map of Ohio.

An overprint of the 1:500,000 scale state base map. No contours. Sheet is 36 by 40 inches. 1951 base, drainage modified in 1974. This map and accompanying table show hydrologic units that are basically hydrographic in nature. The Cataloging Units shown supplant the Cataloging Units previously used by the U.S. Geological Survey in its Catalog of Information on Water Data (1966-72).

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OPEN-FILE REPORTS OF THE U.S. GEOLOGICAL SURVEY

Open-file reports are available for inspection at the Columbus, Ohio and Reston, Virginia offices of the U.S. Geological Survey. For information about purchasing these reports, contact the Open-File Services Section, Western Distribution Branch, U.S. Geological Survey, Box 25425, Federal Center, Denver, CO 80225, telephone (303) 234-5888.

UNNUMBERED OPEN-FILE REPORTS

Anttila, P. W., 1970, A proposed streamflow program for Ohio.

Cross, W. P., 1967, Flood of July 12, 1966, in the vicinity of Sandusky (Huron County), Ohio.

Deutsch, Morris, and Wallace, J. C., 1966, Six illustrations showing water-resources information on Maumee River basin, Ohio.

Feulner, A. J., 1960, The ground-water resources of Champaign County, Ohio.

Mayo, R. I., Webber, E. E., and Ellis, D. F., 1971, Floods of July 4-8, 1969, in north-central Ohio.

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Hren, Janet, and Jones, R. L., 1982, Potential impacts of a proposed reservoir on hydrologic and water-quality conditions in Little Rush Creek watershed, Fairfield County, Ohio: U.S. Geological Survey Open-File Report 82-109.

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Mayo, R. I., 1977, Hydraulic analysis, Mad River at State Highway 41, Springfield, Ohio: U.S. Geological Survey Open-File Report 77-399.

Mayo, R. I., and Bartlett, W. P., Jr., 1981, Hydraulic analysis, Paint Creek at State Route 772, Chillicothe, Ohio: U.S. Geological Survey Open-File Report 81-350.

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18-75 Digital model simulation of the glacial-outwash aquifer at Dayton, Ohio, by R. E. Fidler. 1976.

76-50 Time of travel of solutes in selected reaches of the Sandusky River basin, Ohio, 1972 and 1973, by A. O. Westfall. 1976.

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These reports may be obtained from the Chief, Division of Water, who can furnish a more complete list of reports of the Ohio Department of Natural Resources, or they may be consulted in the offices of the Chief, Division of Water, or of the District Chief, Water Resources Division, U.S. Geological Survey, at the address given in this report.

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